Research and Development Program 3.7

FY 1998 Research-Based Personnel and Training Study and Analysis Program

"Building the Ultimate Smart Weapon: The American Soldier"

United States ARMY RESEARCH INSTITUTE

October 1997

The mission of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is to conduct personnel performance and training research, development, studies and analyses in support of Army goals. The purpose of this document is to describe the studies and analyses that ARI will conduct in Fiscal Year 1998.

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If you have questions about specific projects in this document, please feel free to contact the individual Points of Contact at the end of each work unit description.

U.S. Army Research Institute for the Behavioral and Social Sciences (ARI)

FY 1998 Research-Based Personnel and Training Study and Analysis Program

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FOREWORD

The Research-Based Personnel and Training Study and Analysis Program was developed in response to requests for timely behavioral science information and data, upon which to base critical personnel and training decisions affecting Army officer and enlisted personnel. FY98 is the seventh year in which ARI has been budgeted funds for the conduct of studies and analyses. This year the only study and analysis requests considered were from the U.S. Army Training and Doctrine Command.

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OVERVIEW

The objective of the ARI Research-Based Personnel and Training Study and Analysis Program is to conduct rapid turn-around investigations to support Army policy and doctrine. The program utilizes behavioral and social science knowledge, expertise, and data bases to provide timely information for informed decision making.

Many of the study and analysis techniques employed in this program have been developed as part of the larger ARI Science and Technology Program. Other methodologies have been adapted from the work of the other Services or civilian investigators. The program uses existing data where possible and generates new data as required.

Summary of Program Characteristics

- Responsive to rapidly changing Army personel and training requirements
- Utilizes behavioral science techniques to address critical soldier-related issues
- Short-term efforts: many of months duration, none more than two years
- Low risk, potentially high impact
- Prioritized for the budget fiscal year

For FY98 nine study/analysis requests were received in response to the call that was extended. Funding and other constraints resulted in selection of the six shown in the table below.

The FY1998 Program

Study/Analysis	Funding ($K)
Force XXI Aviation Battle Staff Training: Integration of C4I Into Battle Simulation	110
Selecting Army Vehicle Drivers	375
Future Live Simulation Control and Feedback (CAF) Concepts Advanced Tactical Engagement Simulation Concepts (ATESC), Phase 1 Cognitive Requirements for Information Operations Training (CRIOT) Advanced AAR Media (A3RM)	330
Methods for Rating Training Effectiveness	132

As described in the pages that follow, the program is organized by **work package**. A work package is defined as a relatively self-contained study or set of studies addressing a specific issue. Individual studies or analyses within a work package are referred to as **work units**.

THE FY 1998 PROGRAM

WORK PACKAGE 2151

FORCE XXI AVIATION BATTLE STAFF TRAINING: INTEGRATION OF C4I INTO BATTLE SIMULATION

OBJECTIVE: To define methods by which lessons learned from Advanced Concept Technology Demonstrations, Advanced Warfighting Experiments, and other exercises relating to training and operations issues of Command, Control, Communications and Computer Integration (C4I), may be incorporated into battle staff training more rapidly through constructive and virtual simulation.

FUNDING($K): **FY98**
110

Work Unit
(2151C1): Force XXI Aviation Battle Staff Training: Integration of C4I Into Battle Simulation

Sponsor: US Army Aviation Center, COL William W. Powell, Director of Training, Doctrine, and Simulation (DOTDS)

SAG: COL William W. Powell, DOTDS, DSN 558-3320
COL Gary S. Coleman, Air Maneuver Battle Lab, DSN 558-3022
LTC Wade Becnel, 1st Aviation Brigade, DSN 558-2338

Issue: Emerging results from recent warfighting exercises which employed digitized C4I capabilities have revealed that benefits could be achieved by incorporating training of tactical and operational staff in employment of those assets . This training may be best implemented using actual or simulated C4I equipment in conjunction with constructive and virtual battle simulations. The equipment and its associated procedures are, however, rapidly evolving. The problem is to introduce C4I training into the program more rapidly.

Approach: A search will be conducted to identify examples of current C4I training programs in all Services. The digitized C4I systems of interest will be defined through documentation, interview, and direct interaction with equipment where available. Descriptions will be made of the current processes for implementing Aviation battle staff training policy, developing battle staff training programs, and for extracting and disseminating lessons learned from warfighting exercises. When these elements have been defined they will be analyzed to develop coordinated procedures for rapidly incorporating lessons learned into the training program. Changes in the current C4I system, to improve information management for

decision making, will be used to illustrate how such modifications can be rapidly introduced into training. Emphasis will be on training the process for developing a Tactical Course of Action and Decision Support Template.

Utilization: Results will be provided to the US Army Aviation Center and other TRADOC Centers as input for policy, doctrine and training program decisions.

Est. Cost($K):

FY98
110

Start Date: 1st Quarter FY98 **End Date:** 4th Quarter FY98

Status: New Start

POC: Dr. Dennis C. Wightman, DSN 558-2834

WORK PACKAGE 2152

SELECTING ARMY VEHICLE DRIVERS

OBJECTIVE: To develop scientifically-based policy and methodology for selecting safe drivers.

FUNDING($K):

FY98
375

Work Unit (2152C1): Selecting Army Vehicle Drivers

Sponsor: U.S. Army Training and Doctrine Command, Mr. Robert Seger, ADCST

SAG: MAJ Gary Stanley, HQ TRADOC, DSN 680-5625
Mr. John Ritter, Transportation School, DSN 927-8009
Mr. Al Brown, U.S. Army Safety Center, DSN 885-2644

Issue: The Army (including the Reserve Component) has over 250,000 wheeled vehicles and 43,000 tracked vehicles which must be operated by a limited force structure (over 1/3 of the total Army must be licensed). There is a need to ensure that only the best qualified individuals are selected to operate these vehicles.

Approach: ARI will analyze (a) the Army's current process for selecting vehicle drivers described in AR 600-55 (The Army Driver and Equipment Operator Standardization Process), and (b) additional factors, which might be considered for inclusion in that process. This study will include analysis of the following:

-- Accident data for wheeled and tracked vehicles
-- Previous studies conducted by the U.S. Army Safety Center
-- Checklists for commanders provided in AR 600-55 (to verify existing components and recommend additions)
-- Accession standards and their relationship to a soldier becoming a licensed Army Vehicle Driver
-- Specific characteristics and/or tendencies that are true indicators of an individual's ability to become a "low risk" driver

Analyses will address the feasibility of identifying "high-risk" individuals prior to training and whether those characteristics and factors can be integrated for checklist use by commanders.

Utilization: Based on the results of this study ARI will propose to TRADOC and to the Office of the DA DCSPER, policy and methodology for selecting safe drivers.

Est. Cost ($K):

FY98
375

Start Date: 1st Quarter FY98 **End Date:** 4th Quarter FY98

Status: New Start

POC: Dr. Michael Rumsey, DSN 767-8275

WORK PACKAGE 2153:

FUTURE LIVE SIMULATION CONTROL AND FEEDBACK (CAF) CONCEPTS

OBJECTIVE: To identify exercise control and feedback capabilities that can be automated to provide trainers with more contact time with units and help trainers address a growing and more information intensive workload.

FUNDING($K): **FY98**
330

SAG: Mr. Terry D. Faber (Chair), Mr. Clifford Letts, and Mrs. Rosemarie Taylor, TRADOC, Combat Training Support Directorate (CTSD), DSN 927-4631

MAJ David Jerome, U.S Army Simulation Training and Instrumentation Command (STRICOM), Project Manager for Combat Support Training Systems (PM-CSTS), DSN 970-5158.

Work Unit (2153C1): Advanced Tactical Engagement Simulation Concepts (ATESC), Phase 1

Sponsor: TRADOC, CTSD, COL Frank G. Whitehead, Director

Issue: Integrated concepts for tactical engagement simulation (TES) are needed that can replace the stovepipe, labor intensive, TES for direct fires, indirect fires and area weapons. New concepts must address non-lethal weapons and new battlefield sensors that require appropriate stimuli from TES.

Approach: This study will build upon a previous study on training analysis and feedback aids (TAAF-Aids) which identified: intrinsic and extrinsic feedback necessary to support training on existing and planned systems, actions required to provide feedback, and gaps in feedback. The current effort will look across systems to provide a concise description of the needs to be met by future TES. Analysts will design and provide rationales for TES concepts that blend live, virtual, and constructive environments.

Utilization: The findings will be utilized by CTSD in defining requirements for future TES systems, instrumentation systems, and feedback systems.

Est. Cost ($K):

FY98
60

Start Date: 1st Quarter FY98 **End Date:** 4th Quarter FY98

Status: New Start

POC: Dr. Stephen Goldberg, DSN 970-3980

Work Unit (2153C2): Cognitive Requirements for Information Operations Training (CRIOT)

Sponsor: TRADOC, CTSD, COL Frank G. Whitehead, Director

Issue: Force XXI will leverage information technology to develop a digitized battlefield communications network integrated with high speed data fusion and known decision aiding expert systems. Little is known about the kinds and format of information operations (IO) data needed to support exercise control and feedback on the digital battlefield.

Approach: The previous effort on training analysis and feedback aids identified intrinsic and extrinsic feedback requirements associated with each of the Army Battle Command Systems and selected automated tactical decision aids. Previous work by the ARI Armored Forces Research Unit identified digital communication issues at the platoon, company, and battalion task force level. This study will build upon past work to identify decisions trainers must make concerning unit IO, determine which decisions need to be supported by information displays, and specify requirements for displays that address trainer information needs.

Utilization: The findings will be utilized by CTSD in defining requirements for systems to support exercise control and feedback for the live environment. Findings will also be used by TRADOC in defining requirements for a Standard Army After Action Review System(STAARS) that can be used across the live, virtual, and constructive environments.

Est. Cost ($K):

FY98
150

Start Date: 1st Quarter FY98 **End Date:** 4th Quarter FY98

Status: New Start

POC: Dr. Stephen Goldberg, DSN 970-3980

Work Unit (2153C3): Advanced AAR Media (A3RM)

Sponsor: TRADOC, CTSD, COL Frank G. Whitehead, Director

Issue: What training information delivery media will support the almost instant, high-volume feedback requirements of Force XXI? Digitization creates a situation where feedback currently available from AAR systems only at the end of an exercise, can now be delivered on tactical systems during exercises. The media and information available to support exercise control and feedback functions are being influenced by battlefield digitization and the development of new technologies.

Approach: The previous effort on training analysis and feedback aids found that trainers often lacked the time and resources to obtain AAR aids making all of the training points they would like to make. This study will identify specific shortfalls in AARs concerning the time and effort required to prepare displays, difficulties obtaining data necessary to prepare displays, difficulties in managing the presentation of displays, and other problems. It will consider how new technologies (e.g.,three dimensional terrain boards), and new applications of older technologies, can increase the efficiency of AAR aid delivery or provide aids that do a more effective job and can influence the timing and method of delivery of feedback.

Utilization: The findings will be utilized by CTSD in defining requirements for systems to support exercise control and feedback for the live environment. Findings will also be used by TRADOC in defining requirements for a Standard Army After Action Review System(STAARS) that can be used across the live, virtual, and constructive environments.

Est. Cost ($K):

FY98
120

Start Date: 1st Quarter FY98 **End Date:** 4th Quarter FY98

Status: New Start

POC: Dr. Stephen Goldberg, DSN 970-3980

WORK PACKAGE 2154

METHODS FOR RATING TRAINING EFFECTIVENESS

OBJECTIVES: To ascertain conditions under which expert ratings are the preferred methods for estimating training effectiveness, and to prescribe rating-elicitation methods that will yield high probabilities of reliable scores and valid inferences.

FUNDING($K): **FY98**
132

Work Unit (2154H1): Methods for Rating Training Effectiveness

Sponsor: Directorate of Training Development and Analysis, ODCST, TRADOC, COL Christopher J. Olson, Director

SAG: Diana Tierney, Chair, ODCST, TDAD, TRADOC, DSN 680-5524
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John Hayes, ARI, TRADOC LSN, DSN 680-5623

Issue: The US Army has traditionally rejected SME ratings and has traditionally accepted field-trial results for estimating training effectiveness. Resource constraints and prohibitive requirements for statistical power in field trials for collective-training evaluation are, however, forcing the Army and other services into increased use of opinion-based training-effectiveness estimates.

Approach: Statistical and program-evaluation literature will be reviewed and used to critique the fallacies surrounding the superiority of field trials to ratings. The critiques will result in documentation of the conditions under which ratings can legitimately be used for estimating training effectiveness. Additional literature will then be reviewed and experts consulted to determine how to arrange and manage rating-elicitation methods to ensure the highly reliable ratings necessary for valid inferences.

Utilization: Information provided by this study will enable TRADOC to promulgate guidance about the use of legitimate alternatives to field testing for estimating training effectiveness.

Est Cost ($K) : **FY98**
132

Start Date: 2nd Quarter FY98 **End Date:** 1st Quarter FY99

Status: New Start

POC: Dr. Stephen Goldberg, DSN 970-3980

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13. SUPPLEMENTARY NOTES

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14. ABSTRACT (Maximum 200 words)

This document describes the ARI FY 1998 Research-Based Personnel and Training Study and Analysis Program. Behavioral and social science knowledge, expertise, and data bases are used to conduct short-term studies and analysés that directly support policy, doctrine, or decisions that affect Army Personnel.

15. SUBJECT TERMS

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